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(72) Inventor: Dea Min Shim

(54) Title of invention: **SPRINKLER HEAD**

(57) Abstract:

A sprinkler head comprises a first housing connected to a water supply pipe installed at an inner side of a building ceiling; a second housing coupled to the first housing; a deflector sealably attached to the first housing and separated from the first housing at the time of a fire occurrence, for deflecting water in right and left directions and in upper and lower directions; a locking portion locked in the second housing for maintaining a sealed state between the deflector and the first housing; a thermal response portion exposed to an outer side of the ceiling and reactive to heat at the time of a fire occurrence, for releasing a locked state of the locking portion; and a hole cover for covering a tool inserting hole formed at the second housing. The sprinkler head prevents foreign materials or moisture from being introduced thereinto thereby to prevent a corrosion or a mis-operation of a sprinkler and thus to enhance a reliability of a product.

[Representative view]

FIG. 5

[Index]

sprinkler, sprinkler head, fire, extinguishing equipment, heat collecting plate, hole
cover

[SPECIFICATION]

[Title of the Invention]

Sprinkler head

[Brief description of the Drawings]

FIG. 1 is a sectional view showing a sprinkler head in accordance with the conventional art;

FIG. 2 is a disassembled perspective view of the sprinkler head in accordance with the conventional art;

FIGS. 3 and 4 are disassembled perspective view of a sprinkler head according to the present invention;

FIG. 5 is a sectional view of the sprinkler head according to the present invention; and

FIGS. 6A, 6B, and 6C are views showing operation states of the sprinkler head according to the present invention.

**** Explanation for the major reference numerals ****

1: water supply pipe	2: first housing
4: second housing	6: deflector
8: locking portion	10: thermal response portion
12: male screw portion	14: flange portion
16: water emitting portion	18: deflector ring
20: leg	22: sealing cap
24: water spray plate	26: set screw
42: locking ring	44: locking groove
50: first loading plate	52: second loading plate

54: first heat collecting plate

56: second heat collecting plate

58: third heat collecting plate

60: fuse metal

62: locking screw

90: tool inserting hole

92: hole cover

[Detailed description of the invention]

[Object of the invention]

[Field of the invention and background art]

The present invention relates to a sprinkler head, and more particularly, to a sprinkler head capable of preventing a mis-operation by preventing foreign materials or moisture from being introduced thereinto.

FIG. 1 is a sectional view showing a sprinkler head in accordance with the conventional art, and FIG. 2 is a disassembled perspective view of the sprinkler head in accordance with the conventional art.

The sprinkler head in accordance with the conventional art comprises a first housing 104 connected to a water supply pipe 102 installed at an inner side of a building ceiling 106; a second housing 110 coupled to the first housing 104 and disposed at a through hole 108 formed at the ceiling 106; a deflector 112 sealably attached to the first housing 104 and separated from the first housing 104 at the time of a fire occurrence, for deflecting water in right and left directions and in upper and lower directions; a locking portion 114 locked at a lower inner circumference of the first housing 104 for supporting the deflector 112 and thereby maintaining a sealed state of the first housing 104; and a thermal response portion 150 exposed to an outer side of the ceiling 106 and reactive to heat at the time of a fire occurrence, for releasing a locked state of the locking portion 114.

The first housing 104 is provided with a male screw portion 170 to which the water supply pipe 102 is coupled at an upper side thereof, is provided with a flange portion 162 having a female screw portion 164 coupled to the second housing 110 at a middle side thereof, and is provided with a water emitting portion 166 to which the deflector 112 is inserted and for emitting water at a lower side thereof.

The second housing 110 is formed to have a cylindrical shape, and is provided with a male screw portion 178 coupled to a bracket 160 supported by the first housing 104 and the ceiling 106 at upper and lower outer circumferences thereof. Also, the second housing 110 is provided with a tool inserting hole 172 for inserting a tool at the time of assembling the deflector 112 at a middle side thereof. Also, a locking groove 126 for locking a locking ring 124 of the locking portion 114 is formed at a lower inner circumference of the second housing 110 in a circumferential direction.

The deflector 112 comprises a deflector ring 130 linear-movably inserted into an outer circumference of the water emitting portion 166 of the first housing 104 and locked at an upper surface of the locking groove 126 of the second housing 104 when the deflector 112 is separated from the first housing 104, a sealing cap 134 adhered to a lower surface of the water emitting portion 166 for closing the water emitting portion 166, a water spray plate 136 fixed to an outer circumference of the sealing cap 134 for spraying water in right and left directions and in upper and lower directions at the time of a fire occurrence, and a plurality of supporting plates 132 for connecting the deflector ring 130 and the water spray plate 136.

A set screw 174 for adhering the sealing cap 134 to the water emitting portion 166 is coupled to a lower surface of the sealing cap 134.

The locking portion 114 comprises a first loading plate 120 contacting the sealing cap 134 of the deflector 126 and having a screw hole 176 at a middle portion thereof, a

second loading plate 122 facing the first loading plate 120, and a locking ring 124 arranged at an inclined surface formed at an edge between the first loading plate 120 and the second loading plate 122 and widened when the first loading plate 120 and the second loading plate 122 are adhered to each other thereby to be locked at the locking groove 126 formed at the second housing 110.

The thermal response portion 150 comprises a plurality of heat collecting plates 152, 154, and 156 mounted at a lower side of the second loading plate 122 and collecting heat at the time of a fire occurrence, a fuse metal 140 positioned at a lower surface of the heat collecting plate 156 and melted when heat collected by the heat collecting plates 152, 154, and 156 reaches a certain temperature, first and second loading plates 120 and 122 coupled to the screw hole 176 formed at the first loading plate 120, and a locking screw 142 for coupling the heat collecting plates 152, 154, and 156 and the fuse metal 140.

The locking screw 142 has an opened center for inserting a tool at the time of adjusting the set screw 174.

An assembly process of the conventional sprinkler head will be explained.

When the deflector 112 is inserted into the first housing 104, the deflector ring 130 is inserted into an outer circumference of the water emitting portion 166 of the first housing 104 and the sealing cap 134 comes in contact with a lower surface of the water emitting portion 166.

Then, the first loading plate 120, the locking ring 124, the second loading plate 122, the plural heat collecting plates 152, 154, and 156, and the fuse metal 140 are sequentially arranged at the second housing 110 from a lower side to an inner side, the locking screw 142 is coupled to the screw hole 176 formed at the first loading plate 120, and a proper torque is applied to the locking screw 142. As the result, the first loading plate 120 and the second loading plate 122 are adhered to each other, and the locking ring

124 is widened along an inclined surface formed at an edge of the first loading plate 120 and the second loading plate 122 thereby to be inserted into the locking groove 126 formed at an inner circumferential surface of the second housing 110.

The second housing 110 to which the locking portion 114 and the thermal response portion 150 are coupled is assembled to the first housing 104. That is, the male screw portion 178 formed at the upper outer circumferential surface of the second housing 110 is bolt-coupled to the female screw portion 164 formed at the flange portion 162 of the first housing 104.

Under the state, the supporting plate 132 of the deflector 112 is held so as not to rotate the deflector 112 and then a tool such as a wrench, etc. is inserted into a center portion of the locking screw 142. Then, the set screw 174 coupled to a lower portion of the deflector 112 is released. As the result, the deflector 112 is relatively upwardly moved, and thus the sealing cap 134 is adhered to a lower surface of the water emitting portion 166 thereby to perform a perfect sealing.

However, in the conventional sprinkler head, the tool inserting hole 172 for inserting a tool for supporting the supporting plate 132 of the deflector 112 is formed at the second housing 110 at the time of assembling the sprinkler head. Accordingly, after installing the sprinkler head, the foreign materials, moisture, etc. are introduced into the second housing 110 through the tool inserting hole 172 thereby to corrode the inner components and cause a mis-operation of the sprinkler head. As the result, the sprinkler head is not generated at the time of a fire occurrence.

[Construction of the present invention]

An object of the present invention is to provide a sprinkler head capable of

preventing a corrosion and a mis-operation by preventing foreign materials or moisture from being introduced thereinto by sealing the sprinkler head, and thereby capable of enhancing a reliability of the product.

The sprinkler head comprises a first housing connected to a water supply pipe installed at an inner side of a building ceiling; a second housing coupled to the first housing; a deflector sealably attached to the first housing and separated from the first housing at the time of a fire occurrence, for deflecting water in right and left directions and in upper and lower directions; a locking portion locked in the second housing for maintaining a sealed state between the deflector and the first housing; a thermal response portion exposed to an outer side of the ceiling and reactive to heat at the time of a fire occurrence, for releasing a locked state of the locking portion; and a hole cover for covering a tool inserting hole formed at the second housing.

Hereinafter, preferred embodiments of the present invention will be explained in more detail with reference to the attached drawings.

FIGS. 3 and 4 are disassembled perspective view of a sprinkler head according to the present invention, and FIG. 5 is a sectional view of the sprinkler head according to the present invention.

The sprinkler head according to the present invention comprises a first housing 2 connected to a water supply pipe 1 installed at an inner side of a building ceiling 61; a second housing 4 coupled to the first housing 2 and arranged at a through hole 5 formed at the ceiling 60; a deflector 6 sealably attached to the first housing 2 and arranged in the second housing 4, for deflecting water in right and left directions and in upper and lower directions by being separated from the first housing 2 at the time of a fire occurrence and maintaining a sealing state of a lower end of the first housing 2; a locking portion 8 locked at an inner circumferential surface of the second housing 4 for supporting the

deflector 6 so that the deflector can maintain a sealed state to the first housing 2; and a thermal response portion 10 exposed to an outer side of the ceiling 61 and reactive to heat at the time of a fire occurrence, for releasing a locked state of the locking portion 8.

The first housing 2 is provided with a male screw portion 12 to which the water supply pipe 1 is coupled at an upper side thereof, is provided with a flange portion 14 having a female screw portion 32 coupled to the second housing 4 at a middle side thereof, and is provided with a water emitting portion 16 to which the deflector 6 is inserted and for emitting water at a lower side thereof.

The second housing 4 is formed to have a cylindrical shape, is provided with a first male screw portion 34 coupled to the male screw portion 32 of the first housing 2 at an upper outer circumference thereof, and is provided with a second male screw portion 38 coupled to a bracket 36 supported at the ceiling 60 at a lower outer circumference thereof. Also, the second housing 4 is provided with a tool inserting hole 90 for inserting a tool to support the deflector 6 not to be rotated so as to pressurize the deflector 6 to a lower surface of the water emitting portion 16 of the first housing 2.

A locking protrusion 40 for locking the deflector 6 is protruding at an inner circumference of the second housing 4 with a certain width in a circumferential direction, and a locking groove 44 for locking the locking ring 42 of the locking portion 8 is formed at the locking protrusion 40 in a circumferential direction.

A hole cover 92 for closing the tool inserting hole 90 and preventing foreign materials or moisture from being introduced into the second housing 4 through the tool inserting hole 90 is mounted at an outer circumferential surface of the second housing 4.

The hole cover 92 is adhered to an outer circumferential surface between the first male screw portion 34 and the second male screw portion 38 of the second housing 4, and is formed to have a ring shape to close the tool inserting hole 90. A rib 94 outwardly bent

to be adhered to a lower surface of the flange portion 14 of the first housing 2 is formed at an upper surface of the hole cover 92.

The hole cover 92 is forcibly fitted into the outer circumferential surface of the second housing 4 thereby to close the tool inserting hole 90.

The deflector 6 comprises a deflector ring 18 linear-movably inserted into an outer circumference of the water emitting portion 16 of the first housing 2 and locked at the locking protrusion 40 of the second housing 4 when the deflector 6 is separated from the first housing 2, a sealing cap 22 adhered to a lower surface of the water emitting portion 16 of the first housing 2 for closing the water emitting portion 16, a water spray plate 24 fixed to an outer circumference of the sealing cap 22 for spraying water in right and left directions and in upper and lower directions at the time of a fire occurrence, and a plurality of supporting plates 20 for connecting the deflector ring 18 and the water spray plate 24.

A set screw 26 is coupled to a lower surface of the sealing cap 22, and the deflector 6 is lifted at the time of releasing the set screw 26. As the result, the sealing cap 22 is adhered to the water emitting portion 16 thereby to seal the water emitting portion 16. Herein, a tool is inserted into the tool inserting hole 90 formed at the second housing 4 thus to hold the supporting plate 20, thereby preventing the deflector 6 from being rotated.

The locking portion 8 comprises a first loading plate 50 contacting a lower surface of the sealing cap 22 of the deflector 6 and having a screw hole 48 at a middle portion thereof, a second loading plate 52 facing the first loading plate 50, and a locking ring 42 arranged at an edge between the first loading plate 50 and the second loading plate 52 and widened when the first loading plate 50 and the second loading plate 52 are adhered to each other thereby to be locked at the locking groove 44 formed at the second

housing 4.

The thermal response portion 10 comprises a plurality of heat collecting plates 52, 54, and 56 mounted at a lower side of the second loading plate 52 and collecting heat at the time of a fire occurrence, a fuse metal 60 positioned at each lower surface of the heat collecting plates 54, 56, and 58 and melted when heat collected by the heat collecting plates 54, 56, and 58 reaches a certain temperature, and a locking screw 62 coupled at the screw hole 48 formed at the first loading plate 50 for integrally coupling the first and second loading plates 50 and 52, the heat collecting plates 54, 56, and 58, and the fuse metal 60 to one another.

The first loading plate 50 and the second loading plate 52 are respectively provided with an inclined surface at each edge of facing surfaces, and the locking ring 42 is positioned between the two inclined surfaces. When the locking screw 62 is tightened, the first loading plate 50 and the second loading plate 52 are adhered to each other and thus the locking ring 42 is widened along the inclined surface thereby to be locked at the locking groove 44 of the second housing 4.

The locking groove 44 formed at the inner circumferential surface of the second housing 4 is formed towards an inner side from a lower surface of the second housing 4 with a certain height. As the result, the locking ring 42 to be locked at the locking groove 44, and the first and second loading plates 50 and 52 are inserted into the second housing 4.

The heat collecting plates 54, 56, and 58 have opened centers for passing the locking screw 62, and comprise the first heat collecting plate 54 arranged at a lower surface of the second loading plate 52 with a certain gap from the second loading plate 52, the second heat collecting plate 56 arranged to have a certain gap from the first heat collecting plate 54, and the third heat collecting plate 58 arranged to have a certain gap

from the second heat collecting plate 56 and having the fuse metal 60 at a lower surface thereof. The first, second, and third heat collecting plates 54, 56, and 58 have the same diameter.

The locking screw 62 is provided with a through hole 96 for passing a tool such as a wrench, etc., and a cap 98 for sealing the through hole 96 is inserted into the through hole 96.

An assembly process of the sprinkler head according to the present invention will be explained.

The deflector 6 is inserted into the first housing 2 along an outer circumference of the water emitting portion 16, and then the sealing cap 22 of the deflector 6 is adhered to a lower surface of the water emitting portion 16.

Then, the first loading plate 50, the locking ring 42, and the second loading plate 52 are sequentially arranged at the second housing 4 from a lower side to an inner side, the plural heat collecting plates 54, 56, and 58 and the fuse metal 60 are positioned at a lower side of the second loading plate 52, then the locking screw 62 is coupled to the screw hole 48 of the first loading plate 50, and a proper torque is applied to the locking screw 62. As the result, the first loading plate 50 and the second loading plate 52 are adhered to each other, and the locking ring 42 is widened along the inclined surface between the first loading plate 50 and the second loading plate 52 thereby to be inserted into the locking groove 44 formed at the second housing 4.

The locking portion 8 and the thermal response portion 10 are coupled to the second housing 4, and then the first male screw portion 34 of the second housing 4 is coupled to the male screw portion 32 formed at the flange portion 14 of the first housing 2. Then, the set screw 26 coupled to the deflector 6 comes in contact with an upper surface of the first loading plate 50.

Under the state, a tool is inserted into the tool inserting hole 90 formed at the second housing 4 thus to support the supporting plate 20 of the deflector 6 so that the deflector 6 can not be rotated. Then, a tool is inserted into the through hole 96 formed at the locking screw 62 thereby to loosen the set screw 26, so that the set screw 26 is supported by the first loading plate 50. As the result, the deflector 6 is relatively lifted, and the sealing cap 22 is adhered to a lower surface of the water emitting portion 16 of the first housing 2 thereby to seal the water emitting portion 16.

When the sealing of the water emitting portion 16 is completed, the cap 98 is fitted into the through hole 96 of the locking screw 62 thereby to seal the through hole 96. Then, the hole cover 92 is forcibly fitted into the outer circumferential surface of the second housing 4, thereby sealing the tool inserting hole 90 formed at the second housing 4.

As the tool inserting hole 90 is closed by mounting the hole cover 92 to the outer circumferential surface of the second housing 4, foreign materials, moisture, etc. are prevented from being introduced into the second housing 4 through the tool inserting hole 90.

When the assembly of the sprinkler head is completed, the male screw portion 12 formed at an upper portion of the first housing 2 is coupled to the water supply pipe 1 through the through hole 5, and then the second male portion 38 of the second housing 4 is coupled to the bracket 36 mounted at the through hole 5 of the ceiling 61.

An operation process of the sprinkler head according to the present invention will be explained.

FIGS. 6A, 6B, and 6C are views showing operation states of the sprinkler head according to the present invention.

As shown in FIG. 6A, under the state that the sprinkler head is assembled to the

ceiling 61, hot air generated at the time of a fire occurrence is lifted thus to pass through the space among the heat collecting plates 54, 56, and 58. As the result, the heat collecting plates 54, 56, and 58 are heated thereby to melt the fuse metal 60 fast.

As shown in FIG. 6B, the gap between the first loading plate 50 and the second loading plate 52 is widened, so that the locking ring 42 is restored to the original state thereby to be separated from the locking groove 44. Then, the locking portion 8 and the thermal response portion 10 are separated from the second housing.

As shown in FIG. 6C, the deflector 6 is separated from the first housing 2 thus to be locked at the locking protrusion 40 formed at the second housing 2. Then, water discharged through the second housing 4 is sprayed through the water spray plate 24 of the deflector 6, thereby extinguishing fire.

[Effect of the invention]

As aforementioned, in the sprinkler head according to the present invention, the hole cover is forcibly fitted into the outer circumferential surface of the second housing thereby to close the tool inserting hole formed at the second housing. Accordingly, foreign materials, moisture, etc. are prevented from being introduced into the sprinkler head through the tool inserting hole after the sprinkler head is installed. As the result, the sprinkler head is prevented from being corroded or mis-operated.

What is claimed is:

1. A sprinkler head, comprising:
 - a first housing connected to a water supply pipe installed at an inner side of a building ceiling;
 - a second housing coupled to the first housing;
 - a deflector sealably attached to the first housing and separated from the first housing at the time of a fire occurrence, for deflecting water in right and left directions and in upper and lower directions;
 - a locking portion locked in the second housing for maintaining a sealed state between the deflector and the first housing; and
 - a thermal response portion exposed to an outer side of the ceiling and reactive to heat at the time of a fire occurrence, for releasing a locked state of the locking portion, in the sprinkler head, a tool inserting hole is formed at the second housing and a hole cover for covering the tool inserting hole is formed at an outer circumferential surface of the second housing.
2. The sprinkler head of claim 1, wherein the hole cover is formed to have a cylindrical shape sealably fitted into an outer circumferential surface of the second housing.
3. The sprinkler head of claim 1, wherein a first male portion and a second male portion are respectively formed at upper and lower sides of the outer circumferential surface of the second housing, and the hole cover is mounted at an outer circumferential surface between the first male portion and the second male portion.

4. The sprinkler head of claim 2, wherein a rib outwardly extending to be adhered to a lower surface of a flange portion of the first housing is formed at an upper surface of the hole cover.

5. The sprinkler head of claim 2, wherein the hole cover is forcibly fitted into the outer circumferential surface of the second housing.

Lois Kantrowitz

From: Thomas Langer
Sent: Tuesday, February 14, 2006 6:17 PM
To: ~EVERYONE AT CPLP
Subject: Lieberman funeral

Information on the funeral for Lance's father is as follows:

Date and time: Wed. Feb. 15 at 1:00 pm

Location: Gutterman's Funeral Home
8000 Jericho Turnpike
Woodbury, NY
(516) 921 5757

Shiva details are as follows:

Date and time: Wed. from after the burial service (approx. 4:30pm) until 9:00 pm
Thurs. from 1 to 5 pm and from 7 to 9 pm.

Location: 50 Elm Dr.
Roslyn, NY 11576
(the home of Lance's parents)

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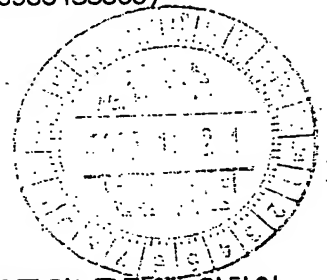
발송번호: 9-5-2005-058427445
발송일자: 2005. 11. 18
제출기일: 2006. 01. 18

수신 서울특별시 강남구 논현동 200번지
박장원

135-826

특 허 청 의견제출통지서

출원인명칭	주식회사 파라다이스산업 (출원인코드: 119986155568)
주 소	경기 부천시 원미구 춘의동 65-2
대리인명칭	박장원
주 소	서울특별시 강남구 논현동 200번지
출원번호	10-2004-0015932
발명의명칭	스프링클러 헤드



이 출원에 대한 심사결과 아래와 같은 거절이유가 있어 특허법 제63조의 규정에 의하여 이를 통지하오니 의견이 있거나 보정이 필요할 경우에는 상기 제출기일까지 의견서[특허법 시행규칙 별지 제25호의2서식] 또는/및 보정서[특허법시행규칙 별지 제5호서식]를 제출하여 주시기 바랍니다. (상기 제출기일에 대하여 매회 1월 단위로 연장을 신청할 수 있으며, 이 신청에 대하여 별도의 기간연장승인통지는 하지 않습니다.)

[이유]

1. 이 출원의 특허청구범위 제1항 내지 제5항에 기재된 발명은 그 출원전에 이 발명이 속하는 기술분야에서 통상의 지식을 가진 자가 아래에 지적한 것에 의하여 용이하게 발명할 수 있는 것이므로 특허법 제29조제2항의 규정에 의하여 특허를 받을 수 없습니다.

[아래]

1. 본원 발명의 청구범위 제1항에는 건물 천장의 안쪽에 설치되는 급수 파이프와 연결되는 제1하우징 및 제2하우징과, 물을 사방으로 확산시키는 디플렉터와, 밀봉 상태를 유지시키는 록킹부와, 천장의 외부로 노출되도록 배치되어 화재가 발생되면 열에 반응하여 록킹부의 록킹을 해제시키는 열 감응부를 포함하는 스프링클러 헤드에 있어서, 제2하우징에는 공구 삽입홀이 형성되고, 제2하우징의 외주면에는 공구 삽입홀을 밀폐시키는 플러그가 장착되는 것을 특징으로 하는 스프링클러 헤드에 관하여 기재하고 있고, 종속항으로서 제2항 내지 제5항은 플러그에 관한 기술적 사항에 대하여 부가한정하여 기재하고 있으나,

이는 국내실용신안공고 제1993-524호(1993.02.10. 이하 인용발명이라 함)에 공지된 스프링클러 헤드본체와, 내향블럭부와, 날밀테부로 구성된 스프링클러 헤드에 관한 발명과 비교해 볼 때, 내부로 이물질 및 습기 등이 침투하는 것을 방지하고 화재시 소화용수를 살수 할 수 있는 스프링클러 헤드를 제공한다는 점에서 발명의 목적이 동일하고, 구성에 있어서도 본원 발명과 대응되는 인용발명의 헤드본체; 헤드하체; 링 걸림부; 디플렉터; 열가용성 가용체 등과 같은 기술적 구성이 유사한 범주에 속합니다. 다만, 본원에서는 공구삽입홀을 두고 이를 밀폐시키는 플러그를 설치하였다는 점에서 인용발명과 상이하나, 이는 인용발명의 구성

중 헤드하체부를 설계변경하여 삼입출을 설치하고 이를 다시 밀폐하기 위해 흡커버를 부가한 것에 불과한 것으로 통상의 지식을 가진 자가 용이하게 발명할 수 있을 뿐만 아니라 효과에 있어서도 공지된 인용발명보다 예측되는 새로운 사항이 있다고 인정되지 아니합니다..

따라서, 본원 발명의 청구범위 제1항 내지 제5항은 이 기술분야에서 통상의 지식을 가진 자가 인용발명에 의하여 별다른 어려움 없이 용이하게 발명할 수 있는 정도의 것으로 판단됩니다. 끝.

[첨 부]

첨부1 국내실용신안공고 제1993-524호(1993.02.10) 1부. 끝.

특허청

2005.11.18
기계금속건설심사국
금속심사담당관실

심사관

김수성



<< 안내 >>

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